



## The level of reliability of the four (full outline of unresponsiveness) score in assessing the level of consciousness of stroke patients

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### ABSTRACT

Similarly to the Glasgow Coma Scale (GCS), the FOUR score can evaluate the level of awareness in stroke patients. This research aimed to evaluate the accuracy of using the FOUR score instrument to the more commonly used GCS method for determining a patient's degree of consciousness in the ER following a stroke. This research method is an analytic observational study with a total of 102 samples, namely stroke patients in the emergency room of RSUD dr. Soehadi prijonegoro Sragen Regency. The process of collecting research data was carried out by three enumerators to see the level of reliability using instruments in the form of awareness assessment observation sheets and standard FOUR score operational procedures. The study found that the FOUR score instrument had a total reliability of 0.830 as measured by the Intraclass Correlation Coefficient (ICC) test, whereas the GCS reliability was 0.864. This study found that the FOUR score and GCS were reliable in determining whether or not a stroke patient was conscious. This finding can be understood to mean that there was no discrepancy in the three evaluators' assessments of consciousness when using the FOUR score or GCS. The recommendation of this study is that follow-up needs to be done to find the sensitivity and specificity values of the FOUR score instrument as an instrument for assessing the awareness of stroke patients.

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### Kata kunci:

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### ABSTRAK

Sama halnya dengan Glasgow Coma Scale (GCS), FOUR score dapat mengevaluasi tingkat kesadaran pada pasien stroke. Tujuan dari penelitian ini adalah untuk mengevaluasi akurasi penggunaan instrumen FOUR score dengan metode GCS yang lebih umum digunakan untuk menentukan derajat kesadaran pasien di UGD setelah stroke. Metode penelitian ini merupakan penelitian observasi analitik dengan jumlah sampel sebanyak 102 orang yaitu pasien stroke di IGD RSUD dr. Soehadi prijonegoro Kabupaten Sragen. Proses pengambilan data penelitian dilakukan oleh tiga orang enumerator untuk melihat tingkat reliabilitasnya dengan menggunakan instrumen berupa lembar observasi pengkajian kesadaran dan standar prosedur operasional FOUR score. Hasil penelitian ini diperoleh tingkat reliabilitas total instrumen FOUR score menggunakan uji Intraclass Correlation Coefficient (ICC) sebesar 0,830, sedangkan pada GCS sebesar 0,864. Kesimpulan dari penelitian ini adalah FOUR score dan GCS memiliki tingkat reliabilitas yang baik dalam menilai tingkat kesadaran pada pasien stroke sehingga dapat diartikan juga di antara ketiga enumerator tidak ada perbedaan persepsi dalam melakukan penilaian kesadaran baik menggunakan instrumen FOUR score maupun metode GCS. Rekomendasi penelitian ini adalah perlu dilakukan tindak lanjut untuk mencari nilai sensitivitas dan spesifisitas dari instrumen FOUR score sebagai instrumen penilaian kesadaran pasien stroke

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## INTRODUCTION

Before nurses can give information on a patient's prognosis, they must do a thorough assessment of the patient's level of awareness, particularly in cases like stroke. An exact and thorough evaluation of a stroke patient's degree of consciousness can help nurses better anticipate the patient's clinical status and provide better care (Alfarikaini & Purnaningsih, 2020; Bordin, 2010). Consciousness is a holistic state that involves the patient's sensory system, logic, imagination, emotions, and memory in relation to internal and external information processing (Aditya, 2020; Vitoulkas & Muresanu, 2014). The occurrence of decreased levels of consciousness in patients can usually be caused by several factors, namely traumatic (traffic accidents, physical violence or falls) and non-traumatic (illness) which can be assessed through an appropriate and comprehensive examination of the patient's physical and medical history (Aditya, 2020; Avner, 2006).

Because of its perceived ease of use and generalizability across a variety of conditions, the Glasgow Coma Scale (GCS) has been one of the most used tools for assessing patients' levels of consciousness ever since it was developed. Almojuela, said that the GCS component is unsatisfactory and has limitations in assessing the consciousness of stroke patients, especially with regard to the verbal component related to aphasic and intubated patients (Almojuela et al., 2019). Patients with severe orbital trauma are also quite difficult to assess the eye component when using GCS, due to the difficulty of patients opening their eyes (Ghelichkhani et al., 2018; Wijdicks et al., 2015). In response to the inadequacies and limits of the GCS, a new instrument for determining the state of consciousness known as the FOUR score was developed; it evaluates the patient's ocular response, motor response, brain stem reflexes, and breathing patterns (Bayraktar et al., 2019; Wijdicks et al., 2015). The recommendation to use the FOUR score instrument is the ability of this instrument to cover the shortcomings of the GCS method. The FOUR score is able to assess eye responses in severe orbital trauma patients who have difficulty opening their eyes and is able to assess brainstem reflexes and also the breathing patterns of stroke patients attached to ventilators which have not been in the GCS (Aditya, 2020; Surya Airlangga et al., 2020).

So far, the FOUR score has not been widely and rarely used in hospitals in Indonesia, so the clinical ability of this instrument is of course still often questioned by nurses. So as a new instrument, of course, it is necessary to review the validity and reliability of this FOUR score instrument before use. Dewi, explained that the FOUR score instrument has a good level of validity and reliability to be used as a tool for assessing the level of consciousness (Dewi, 2016). Another opinion says if a new instrument should meet one of the other requirements, namely easy to use, meaning that it only requires a simple but clear procedure and does not require tools in conducting the assessment so that the reliability between assessors becomes the same or one perception (Aditya, 2020; Iyer et al., 2009). The reliability of an instrument is related to the accuracy of the measurement process and how far the measurement results can be replicated in several measurements so that the quality of the instrument can also be seen (Ismunarti et al., 2020). This means that if there is an error from using an assessment instrument, the results obtained are also less valid and errors occur. Therefore, the purpose of this research is to evaluate the validity of using the FOUR score tool to evaluate

consciousness in emergency care patients who have suffered a stroke.

## METHODS

In this study, 102 patients who had suffered a stroke were observed prospectively at the emergency room of RSUD dr. Soehadi Prijonegoro in the Sragen Regency. Three observers scored the patient on the Glasgow Coma Scale (GCS) and the FOUR score instruments and recorded their findings on a specially designed observation sheet; the scores were compared using the Intraclass Correlation Coefficient (ICC) to determine the level of agreement between the three observers. The three observers are emergency room nurses who have been given briefings or simulations related to the procedure for assessing awareness using both GCS and FOUR score instruments.

## RESULTS AND DISCUSSION

The data collection process in this study was carried out by three enumerators or observers who before the data collection process carried out an apperception related to the procedure for assessing awareness with the GCS method and the FOUR score instrument. The data collection instrument used an awareness assessment observation sheet with both the FOUR score and GCS instruments. Before using the research instrument, a face expert test was carried out by two experts, namely a neurologist and a senior nurse in the emergency room. According to the results of the face expert test that has been carried out, it is explained if the research instrument is feasible and can be used in collecting research data. A total of 102 research samples were assessed for awareness using the FOUR score and GCS instruments which were then analyzed to find the results of the study. The results of the reliability test using the Intraclass Correlation Coefficient test obtained a total ICC value of the GCS instrument of 0.864 and the FOUR score instrument of 0.830. When looking at the acquisition of the reliability test value of the two instruments, it can be said that both are in the excellent category, which is  $> 0.75$ .

Based on the results obtained from the Intraclass Correlation Coefficient (ICC) test of the two instruments, namely FOUR score and GCS, the results are very good (0.830 and 0.864), so that the two instruments have a very good level of reliability. When the same continuous variable is measured by two or more independent instruments, the ICC is used to assess the degree to which the results from each instrument agree with one another. The range of ICC values is from 0 to 1 ( $0 \leq \text{ICC} \leq 1$ ) (Ismunarti et al., 2020). If the ICC value is close to 1, it shows that the reliability of the instrument being measured is close to perfect. Conversely, if the ICC value is close to 0 or lower, it means that the reliability value of the instrument being measured is not good or weak. This may occur if the instrument is not reliable, the measured object is not stable, or the measuring conditions are undesirable (Ismunarti et al., 2020; Mehta et al., 2018; Zaki, 2017). The results of this study are in line with Vahdati et al who explained that the FOUR score has superior reliability to GCS with a value of  $k = 0.86 \pm 0.01 > \kappa = 0.84 \pm 0.01$ . FOUR score also has the same ability as GCS in predicting mortality and improving the management of trauma patients in the emergency room (Vahdati et al.,

2017). Almojuela et al. also concluded that of the 14 articles that discuss the FOUR score and GCS, the majority of these articles have a level of reliability in the good to excellent category (Almojuela et al., 2019).

Meanwhile, research conducted by Silvitasari et al. obtained the results of the reliability level between the FOUR score and GCS of 0.891 and 0.973, respectively, where both instruments were included in the excellent category (0.8 - 1.0) (Silvitasari, 2016; Sujianto et al., 2017). In other words, it can be concluded that there is no difference in the perception of observers who conduct assessments using GCS and FOUR score. As is known if GCS is very commonly used in assessing the level of consciousness in hospitals and pre-hospitals. It is widely held, however, that GCS has a number of drawbacks, including a lack of brainstem reflex evaluation components and the inability to account for patients' unique breathing patterns while they are intubated, limited assessment of eye responses and motor responses in patients receiving sedation drugs (Iyer et al., 2009; Oktarina & Simajuntak, 2017). The FOUR score is able to demonstrate the ability to overcome these GCS limitations and is also quite easy to use because it is easy to remember where the value of each component of the FOUR score assessment has the same value, which is from 0 to 4.

#### LIMITATION OF THE STUDY

This research could be improved by examining the reliability of the GCS and FOUR score components individually.

#### CONCLUSIONS AND SUGGESTIONS

The FOUR score and GCS instruments have a good level of reliability in assessing the level of consciousness in stroke patients so that it can also be interpreted that among the three enumerators there are no differences in perception in assessing consciousness using either the FOUR score instrument or the GCS method. The limitation of this study is that researchers have not assessed the reliability of each component of the two instruments, namely GCS and FOUR score. The recommendation of this study is that follow-up needs to be done to find the sensitivity and specificity values of the FOUR score instrument as an instrument for assessing the awareness of stroke patients.

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#### ETHICAL CONSIDERATIONS

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#### Conflict of Interest Statement

The researchers have not revealed any potential conflicts of interests.

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